

COURSE SYLLABUS

COURSE TITLE:	BIOL 121 The Diversity of Life		
COURSE CODE:	60619	TERM:	Q4Spring/Summer2018
COURSE CREDITS:	3.0	DELIVERY:	Lecture & Practicum (Lab)
CLASS SECTION:	01	START DATE:	July24 th 2018
CLASS LOCATION:	Room BIOL 106	LAB LOCATION:	Room BIOL 204
CLASS TIME:	8.30 to 10.50 am (MTWRF)	LAB TIME:	1.30 to 4.20 pm
WEBSITE:	via Blackboard		

Course Description

Our world has at least 15 million species, all of which have adapted to particular environments and lifestyles and use energy to grow and reproduce. We examine these processes in representative organisms from all the major groups, and discuss factors influencing changes in biodiversity over time and space.

Prerequisite(s): Biology 30 or BIOL 107 or BIOL 108.

Note: Students with credit for BIOL 110 will not receive credit for BIOL 121.

Course Overview

This course is designed to introduce you to the vast and exciting field of biology, with a focus on biological diversity, evolution, adaptations of organisms to specific environments, and the evolutionary and ecological factors influencing changes in biodiversity over time and space.

Learning Outcomes

By the completion of this course, students will be expected to:

1. have an understanding of biological principles (concepts), and that evolution is the unifying principle in biology
2. gain an appreciation for biology as an experimental science [hence, provide necessary background for advanced study of biology and other related disciplines], and realize that an understanding of biological principles requires knowledge of other fields of science (chemistry, physics, geology, geography, mathematics, biochemistry) and many disciplines within biology (e.g. evolution, ecology, genetics, physiology, structure and function, ethology, parasitology, molecular biology, etc.).
3. obtain knowledge of the diversity and complexity of life, which includes how organisms are adapted to their environment and the variation (e.g. morphological, genetic, physiological, behavioral) that exists among individuals of the same species and between individuals of related species
4. be able to think critically regarding scientific issues in our society and understand the importance of relationships between organisms and their environment, and how biodiversity is constantly changing over time

Specifically, students should know:

- the characteristics that unite all living organisms, and why viruses and prions are considered non-living entities
- the differences between unicellular/multicellular organisms and heterotrophs/autotrophs
- that different organisms reproduce in different ways; sometimes using more than one mode of reproduction; and the advantages/disadvantages of asexual/sexual reproduction
- that water represents the matrix or solvent of life
- the biological species concept and other ways to define species; the hierarchical system of nomenclature
- that there is difference between species and variation among individuals in, for example, their morphology, genetics, ethology, ecology, physiological responses to the same environmental conditions, etc.
- that museums represent the catalogues of the diversity of life both in time and space
- the definition of biological diversity; and the problems with quantifying species diversity
- that species are not fixed in time; what Darwin saw and how he made conclusions about his observations that led to the theory of evolutionary change by means of natural selection; and the evidence to support this theory
- that some organisms are more suited (better adapted) to their environment, but that this is no guarantee of survival and opportunity to reproduce; the concept of reproductive fitness
- that variation is essential for natural selection to work; natural selection acts on individual organisms but evolutionary change take place at the population level
- the differences between microevolution/macroevolution; the principles of homology, analogy and homoplasy; allopatric species, adaptive radiation, and that evolution is unidirectional
- the difference between natural selection/sexual selection; importance of the differences (diversity) between sexes
- the difference between biotic and abiotic factors; influence of abiotic factors on the reproductive fitness of organisms
- that there is considerable ecosystem diversity – and that environments and the organisms in them have changed over time
- what were the first organisms that lived on earth, the importance of O₂ in changing species diversity, why did multicellularity come about, the conquest of land and air (by multiple groups) and the challenges organisms faced and how they were overcome [examples of adaptation]
- when the ancestors of the representative organisms appeared on earth
- that species diversity has changed over time in response to major environmental changes; e.g. mass extinctions, climatic change [pre-human effects]
- what is symbiosis and the types of symbiotic relationship; coevolution [arms-race; predator-prey, parasite-host] and the role these play in changing biological diversity; the role of competition
- the interrelationships of organisms and biodiversity; concepts of niche, food webs/chains
- the relationship between species diversity and the theory of island biogeography
- the relationship between community structure (and trophic relationships) and species diversity in communities
- the effect of human (Anthropogenic) influences [fire, invasive species, habitat fragmentation, mining, etc.] on biodiversity over space and time [past, present, future]; including the Canadian prairies
- the concept of biological hotspots, and why the need to conserve biological diversity

Note: The University of Saskatchewan Learning Charter is intended to define aspirations about the learning experience that the University aims to provide, and the roles to be played in realizing these aspirations by students, instructors and the institution. A copy of the Learning Charter can be found at: http://www.usask.ca/university_secretary/LearningCharter.pdf

More information on the Academic Courses Policy on course delivery, examinations and assessment of student learning can be found at:

http://www.usask.ca/university_secretary/council/academiccourses.php

Class Schedule

DAY	Major Lecture topics	LAB TOPIC (see lab manual for details)
1 July24	Course Introduction, 25 representative organisms; pioneers and scholars in biology; inductive & deductive reasoning in study of science; scientific methods; introduction to life and water	NO LAB
2 July25	Living & non-living entities; characteristics of life; hierarchy of life	LAB 1 - Introduction & Prokaryotes
3 July26	Introduction to biodiversity; unicellular organisms; prokaryote vs eukaryote; bacteria; viruses, viroids and prions; classification of organisms; domains of life	LAB 2 - Protists
4 July27	Introduction to biodiversity; plantae; fungi; protists	LAB 3 – Fungi Quiz on Labs 1, 2 10 marks
5 July30	Animalia; intraspecific & interspecific variation	LAB 4 - Plants I - Green algae, Mosses, Club mosses & Ferns
6 July31	Microevolution & macroevolution; concepts of morphological, ecological species, biological species	LAB 5 - Plants II - Conifers & Angiosperms Flower project (in lab assignment) 15 marks
7 Aug 1	Changes in biodiversity through time; theory of evolution of Darwin	No LAB—Study for midterm exam
8 Aug 2	Changes in biodiversity through time; evidence to support the theory of evolution Mid-term Exam	LAB 6 - Animals I - Sponges, Cnidarians, Flatworms & Nematodes Spot Test/Quiz – Labs 3,4,5 25 marks
9 Aug 3	Evidence to support the theory of evolution (cont')	No Lab
10 Aug 6	NO LECTURE	No LAB – Saskatchewan Day- University Closed
11 Aug 7	Variations; biological adaptation; adaptation by natural selection;	LAB 7 – Animals II - Segmented worms, Mollusks & Arthropods- In-lab assignment

	sexual selection; geographic isolation;	10 marks
12Aug 8	Diversity of life; evolution and evolutionary steps of life; allopatric speciation; adaptive radiation; history of earth; geologic time scale; living fossils	LAB 8 - Echinoderms & Chordates Spot Test - Labs 6,7 10 marks
13Aug 9	Interactions between organisms and effects on biodiversity; unknown species; dominant species, and keystone species	REVIEW LAB (Assignments total = 70 marks) (= 20% of mark)
14Aug 10	Biodiversity hotspots; measurement of biodiversity; subfields of ecology; biotic and abiotic factors	No LAB/Additional review if necessary
15Aug 13	Types of species interactions; introduced and invasive species; functional extinction	FINAL LAB EXAM Lab exam (= 20% of mark)
16Aug 14	Human influences on biodiversity and ecosystem; conservation of biodiversity course wrap-up and course review	
TBA	Final Exam	

Laboratory class information:

1. Labs begin on July 25th. **Make sure you have registered for a lab on-line.** Students are expected to attend and be on time for all scheduled labs, review labs and final lab exams. The lab schedule is provided on the previous page of this document.
2. **The current edition of the Biology 121.3 lab manual is required for all labs** (this item can be purchased from the Bookstore in Marquis Hall). For your labs you may also need a 2H, 3H or 4H drawing pencil, loose-leaf or white (unlined) drawing paper, a calculator, an eraser and a metric ruler.
3. Any other questions regarding the lab should be directed to the laboratory staff in Room 216.

Instructors, Course Coordinator & Lab Coordinator

Contact Information:

Mr. Joel Yurach
Lab coordinator/instructor

joel.yurach@usask.ca
room 216 Biology Bldg

306-966-4423

Dr. Manar Angrini

manar.angrini@usask.ca

Lecture instructor

room 324 Biology Bldg

306-966-4437

Required Resources (purchase from Main bookstore, Marquis Hall)

Lab Manual: Biology 121.3 Laboratory Manual (2017-2018 Edition)

There is **NO** required textbook for this course

Downloads

These will be available as appropriate through the course Blackboard. The only document that you are required to download and read is the course syllabus. **Please note that instructor's Powerpoint slides or lecture notes may be provided to you as a courtesy.** You are not required to download or print these slides/notes. While the instructors will endeavour to have the lecture Powerpoint slides/notes posted sometime in advance of the lectures; however, they will not guarantee this. Each instructor will provide you with additional information about their downloads.

Grading Scheme

Midterm exam	15
Final exam	45
Lab Assignments & quizzes	20
Lab exam	20
Total	100%

Evaluation Components

Midterm Exam:

Value: 15% of final course grade

Date: ***This midterm lecture exam will be held on Thursday, August 2^{ed}*** at 9:30am, at the lectures classroom

Length: 50 minutes

Format: 40 multiple-choice questions; machine marked

Description: Included material will be announced in class. Calculators and all other electronic devices are not allowed.

Final Exam:

- Value:** 45% of final course grade
Date: Consult Final Exam Schedule
Length: 3 hours
Format: 100 multiple-choice questions; machine marked
Description: The exam is comprehensive in that it will cover all lecture material. However, material delivered after the midterm exam will be emphasized. Calculators and all other electronic devices are not allowed.

Laboratory Assignments & Quizzes:

- Value:** 20% of final course grade
Date: see Laboratory Schedule
Format: Quizzes (written); spot tests; flower project
Description: The quizzes will be 15-20 minutes in duration and test material from the previous two or three lab exercises. The questions will generally require a short written answer. Spot tests involve images shown in PowerPoint and short questions about the specimen shown. No phones, laptops, tablets or other material allowed. Additional information about the lab quizzes can be found in your lab manual, and will be given in the weeks prior to the assignment.

Laboratory Exam:

- Value:** 20% of final course grade
Date: Monday, Aug 13th 2018 (starting at 1.30 pm)
Length: 1.5 hours
Format: This will be a mixture of spot test, short written answers and possibly practical questions (slide prep, etc)
Description: The exam is comprehensive in that it will cover all laboratory classes. Calculators and all other electronic devices are not allowed.

University of Saskatchewan Grading System

Students in BIOL 121 are reminded that the University has established a grading system to be used in all of its courses. Information on literal descriptors for grading at the University of Saskatchewan (reproduced below) can be found at:

<http://students.usask.ca/current/academics/grades/grading-system.php>

Scheduling of Exams

Students must bring their current University of Saskatchewan student card to all exams and be prepared to present it for verification purposes. Entry into certain campus buildings where exams may be held, also requires a valid student card.

It is forbidden for students to utilize in any way during an exam, any electronic device (e.g., cell phone, dictionary, palm pilot, translator, etc.). This includes calculators because these are not required for any exam.

Midterm and final examinations, and the lab exam, must be written on the date scheduled. Final examinations may be scheduled at any time during the examination period in August 2017; students should therefore avoid making prior travel, employment, or other commitments for this period.

In the event that a student is absent from the **midterm exam** through no fault of his/her own due to a medical emergency, death in the family, or other valid reasons, documentation must be provided explaining the absence, to assist in the determination of whether permission will be granted for the student to write a deferred mid-term exam. Students absent for the Mid-Term Lecture Exam **must advise their instructor and initiate arrangements for writing a Deferred Mid-Term Exam, within 3 working days of the missed exam**, in order to avoid being assigned a grade of zero for the exam.

If a student is absent from the **final exam** through no fault of his or her own for medical or any other valid reason, **he/she must apply to the Dean's Office of the College in which he/she is registered for an opportunity to write a Deferred Final Exam, within 3 working days of the missed exam**. Documentation must also be provided to explain the absence from the final exam. Deferred exams may utilize a different format than the regular exam, at the sole discretion of the instructors.

Consult page 2 of the 2016-2017 Lab Manual for the procedure to follow for a missed Lab Exam.

Students are encouraged to review all examination policies and procedures:
<http://www.usask.ca/calendar/exams&grades/examregs/>

Student Feedback

Marks from machine-graded exams are usually available within one week. The multiple-choice questions will not be posted after the exam. Students will be encouraged to meet with the instructor to review their performance.

Attendance Expectations for Laboratory Classes

Students are expected to attend all scheduled lab periods. Students are advised to consult the lab manual for further information about BIOL 121 procedures to follow when they are too ill to attend the lab period (and/or lab exam) or are facing extenuating personal circumstances.

Integrity Defined (from the Office of the University Secretary)

The University of Saskatchewan is committed to the highest standards of academic integrity and honesty. Students are expected to be familiar with these standards regarding academic honesty and to uphold the policies of the University in this respect. Students are particularly urged to familiarize themselves with the provisions of the Student Conduct & Appeals section of the University Secretary Website and avoid any behavior that could potentially result in suspicions of cheating, plagiarism, misrepresentation of facts and/or participation in an offence. Academic dishonesty is a serious offence and can result in suspension or expulsion from the University.

All students should read and be familiar with the Regulations on Academic Student Misconduct (http://www.usask.ca/university_secretary/honesty/StudentAcademicMisconduct.pdf) as well as

the Standard of Student Conduct in Non-Academic Matters and Procedures for Resolution of Complaints and Appeals (http://www.usask.ca/university_secretary/honesty/StudentNon-AcademicMisconduct2012.pdf)

For more information on what academic integrity means for students see the Student Conduct & Appeals section of the University Secretary Website at:
http://www.usask.ca/university_secretary/pdf/dishonesty_info_sheet.pdf

Important Note: Additional information about student misconduct specific to BIOL 121 can be found in the laboratory manual. BIOL 121 students are required to read and understand the information about misconduct that is presented in the laboratory manual.

Student Supports

Student Learning Services

Student Learning Services (SLS) offers assistance to U of S undergrad and graduate students. For information on specific services, please see the SLS web site
<https://library.usask.ca/studentlearning/>.

Student and Enrolment Services Division

The Student and Enrolment Services Division (SESD) focuses on providing developmental and support services and programs to students and the university community. For more information, see the SESD web [site http://teaching.usask.ca/](http://teaching.usask.ca/).

College Supports

Students in Arts & Science are encouraged to contact the Undergraduate Student Office and/or the Trish Monture Centre for Success with any questions on how to choose a major; understand program requirements; choose courses; develop strategies to improve grades; understand university policies and procedures; overcome personal barriers; initiate pre-career inquiries; and identify career planning resources. Contact information is available at:
<http://artsandscience.usask.ca/undergraduate/advising/>

Examinations through Access and Equity Services (AES)

Students who have disabilities (learning, medical, physical, or mental health) are strongly encouraged to register with AES if they have not already done so. Students who suspect they may have disabilities should contact AES for advice and referrals. In order to access AES programs and supports, students must follow AES policy and procedures. For more information, check <https://students.usask.ca/health/centres/access-equity-services.php> or contact AES at 966-7273 or aes@usask.ca.

Students who are in need of accommodation for the course must present the appropriate letter from AES to the course coordinator. Students registered with AES may require alternative arrangements for examinations. Students must arrange such accommodations through AES by their stated deadlines.
